DEVELOPMENT OF LARGE ENTERPRISES FINANCE DYNAMICS MODEL WITH THE WORKBENCH
用工作台开发大型企业财务动力学模型

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ABSTRACT: Taking the financial system of large industrial enterprises as the example, this paper makes a detail introduction of the method, steps and crucial points of programming financial dynamics model with the simulation software development workbench. The financial dynamics of the large enterprise consists of submodel of cost, submodel of fixed assets, submodel of fund, submodel of tax and submodel of price.

1. PRELIMINARY REMARKS

To simulate the financial system of enterprise with electronic computer and to establish the financial dynamics model can not only make a detailed analysis of the past of the economic activities of finance, what is more, predict the future scientifically and control the economic activities of the enterprises effectively, leading it to the fixed goal. This also provides helpful information for the business management departments to make optimnm desision and to run effectively. Taking the financial system of the large enterprises as the example, the paper describes the method, steps of development and crucial points of establishing system dynamics model with the simulation software development workbench. This paper consists of the following parts:

.Brief introduction to software development workbench

.Model of general structure of the financial system of large enterprises

.Steps of development of financial submodels with workbench

.Problems which need to be noticed during the development

2. BRIEF INTRODUCTION TO THE WORKBENCH

Usually, DYNAMO language -- the superior programming language is used on the computer to develop the system dynamics model. Although DYNAMO language mixes model, algorithm and program into one, the software system still remains in the language level. The application of simulation software development workbench to develop the system dynamics model can greatly shorten the cycle of the software development and reduce the mistakes of the software. This is because the simulation software development workbench faces application and users directly and combines the development tools with functional elements. These functional elements appear in the form of module and have good user interface.

The simulation software development workbench mainly consists of four parts: initial information management, three library, model programmer and running table.

2.1 The initial information management part completes the following three tasks: define five kinds of document structure on the total screen of computer with initial definition tools; inlet, revise and delete the relevant data with data management module according to the above-mentioned document structure, e.g. name of variable, name of constant, name of table function, initial value, characteristic constant and so on. The data memory management module can turn the examined data into the data documentation in the disc data base, at the same time, can make the corresponding recognizable marks for the data of different users.

2.2 The three library of the workbench refer to the catalogue database, working database and result database. The catalogue databasse memorizes the structure information of the data documentation, initial value, constant value of variable and other characteristic information. Every user can make separate data subbase in the database and conduct simple operation of the data in the base. The working database have two function: one is to memorize the simulated model and interface information. the other is to memorize the intermediate data of the simulating process. The result database memorizes the outlet data produced after the model simulation and these outlet data can also be used as the new catalogue data.

2.3 The programmer of the simulated model consists of inlet interface module, outlet interface module and the model programming aids. The user can use the model programming aids to mutually design models, make revisions and examine the grammar on the total screen.
2.4 The running table have three function: selecting the expression of result, defining the operating parameters and defining the driving function.

3. FINANCIAL SYSTEM STRUCTURE OF LARGE ENTERPRISES

We can divide the financial system model of large enterprise into five parts: submodel of cost, submodel of accumulation, submodel of fund, submodel of price and submodel of special fund, see fig. 1.

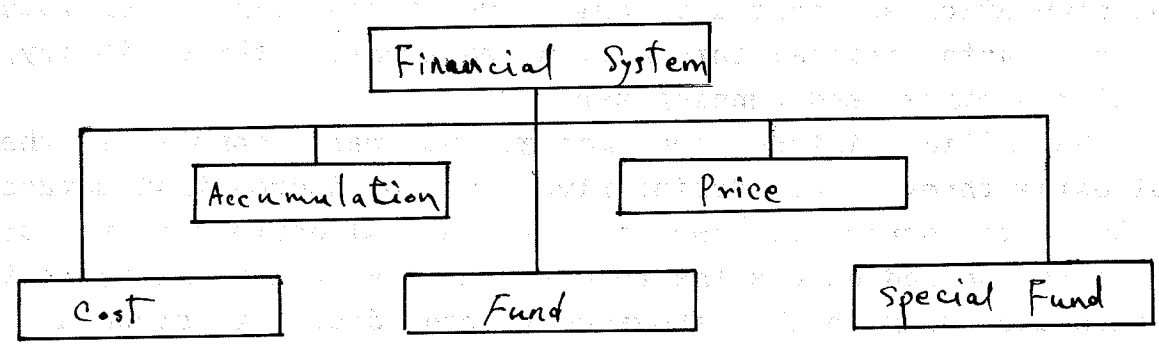

fig.1 general model of financial system

The cost of enterprises directly reflects the level of production management of the enterprises and directly affects the profits of the enterprises. It is an important index. Careful analysis and control of cost as well as constantly reducing cost can make the products more competitive on the markets.
The accumulation of the enterprise is the important fund source for expanded reproduction. It has two form: tax and profits. This is also an important comprehensive index of the financial system.
The management of fund is another task of financial management. Fund circulation must be shortened, reasonable fund demand must be determined and the efficacy of fund must be made full use to ensure the normal production of the enterprise.
Special fund is the fund for all kinds of special purposes according to the requirement of the enterprises. It is an important

management work to draw fund from bank in time, to save it, to cancel after verification in time and to make full use of the benefit of the special fund.
Price is the economic lever and plays a significant role in the financial management. To purchase excellent goods and to fix a reasonable sales price are extremely important for reduction of cost and increase of profits.

4. THE DEVELOPMENT METHOD OF FINANCIAL MODEL WITH WORKBENCH

The new development method of system dynamics model is expounded in detail through the following examples.

4.1 Cold start up of the workbench

The cold start up of the simulation software development workbench refers that for the first time, the user installs the software on the computer and is ready to use the workbench. During the process of cold start up, the following work should be done.

a) State variable document structure, decision-making variable document structure, auxiliary variable document structure, constant document structure and table function document structure are defined according to grammar with the help of language defining aids.

b) Defining the driving function document structure, which includes: random function, impulse function, stage-skipping function ramp function and so on.

4.2 Normal operation of the system

After the completion of the above mentioned cold start up, the system dynamics model developed will the workbench can operate according to the following normal method.

4.2.1 Submodel of cost

The submodel of financial cost of the enterprise is ilustrated in figure 2.
The submodel of cost consists of 4 state variable and 3 decision making variable.
The development process of submodel of cost with simulation software development workbench is as follows:

a) Enter the software system of the workbench (file=WB).

b) Selet the inlet management module, define the charact-

eristic parameter of state variable and define the characteristic parameters of decision making variable.

The name of the state variables are:

XS0, XS1, XS2, XS3

The name of the decision making variable are:

XSL1, XSL2, XSL3

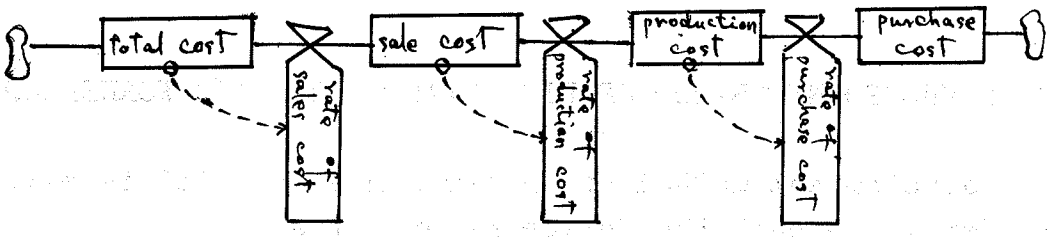

fig. 2 submodel of cost

c) Select the inlet management module and initial value is given to variable.

d) Select the model programmer and alternately define the decision making variable equation and state variable equation of the model according to the classified name of the variables pointed out by the system. After chacked with grammar, the model is memorized in the operating database and at the same, document of list of constant names is produced.

e) Enter the inlet management module, and give value to the constant names according to different class. If these is a form of expression, new name will arise and new values will be given. These are at most 3 kinds of names.

f) Enter the operating running table and define the form of expression of outlet results.

g) Enter the operating running table and define the operating parameters (including the calculating intervals and time of stop).

h) start and operate the simulated models.

4.2.2 Submodel of special fund

Submodel of special fund of the enterprise is illustrated in figure 3. 11 items are included in the submodel of special fund. Within one item, there is a state variable, 2 decision making variable and one auxiliary variable.

The development process of submodel of special fund with simulation software workbench is as follows:

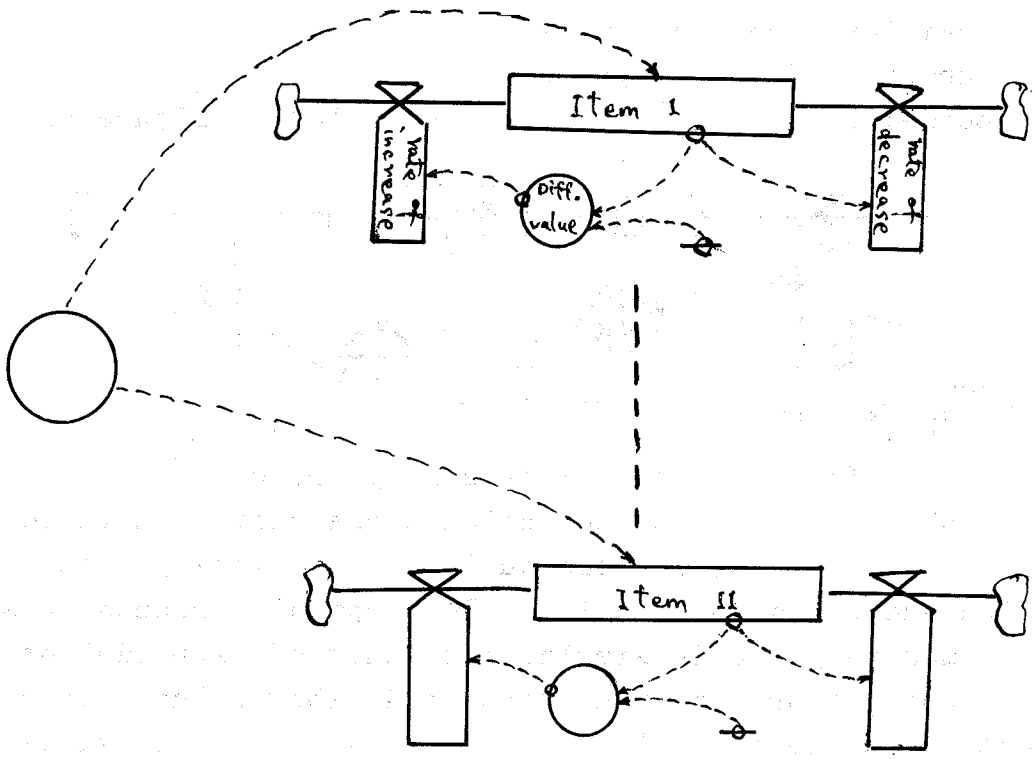

fig. 3 submodel of special fund

a) Enter the system of the workbench.

b) Enter the inlet management module, define the state variable, decision-making variable and auxiliary variable parameters as well as give initial values.

The name of the state variable:

XH1, XH2, ...XH10, XH11

The name of the decision-making variable:

ZJ1, JS1; ZJ2, JS2; ZJ11, JS11

The name of the auxiliary variable:

CZ1, CZ2, ...CZ10, CZ11

c) Enter the model programmer and design state equation, decision-making equation and auxiliary equation of the model according to the name of state variable, name of decision-making variable and name of auxiliary variable. After examination with grammar, a list of name of contants is produced. The name of contants are:

CS1, CS2, ... CS10, CS11

d) give values to the contants name.

e) Enterthe running table, select the outlet mode, opera-

ting parameters and start up model.

4.2.3 Submodel of memory-price

The submodel of memory-price is illustrated in figure 4.

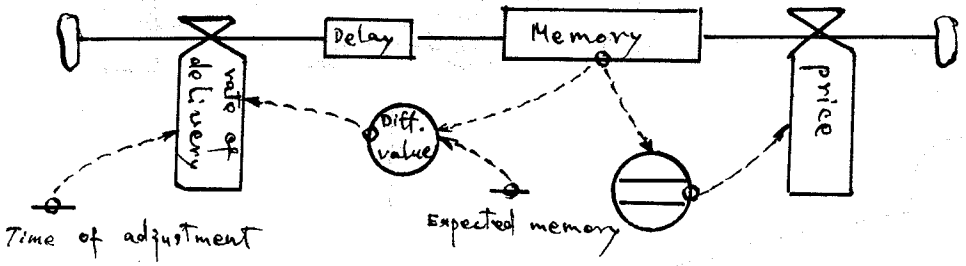

fig. 4 submodel of memory-price

The submodel of memory-price includes one state variable, two decision-making variable, one auxiliary variable, one table function and one delay function. Development process of submodel of memory-price is simular with that of submodel of cost and submodel of special fund mentioned above. The difference is that after the contants are given values, inlet management module should be entered according to the name of table function and value should be given to the table function.

The name of state variable; XCL

The name of decision-making variable: JHL, JG

The name of auxiliary variable : JCZ

The name of table functiion: B1

4.2.4 Submodel of profits

The submodel of profits consists of a state variable and one descision-making variable as illustrated in figure 5.

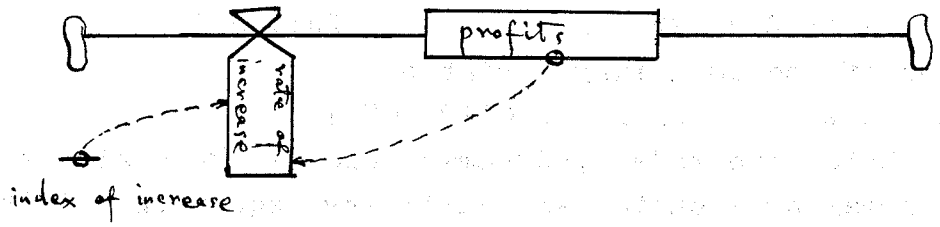

fig. 5 submodel of profits

The development process of the submodel of profits with the workbench is similar to the above mentioned process and it is not repeated here.

4.2.5 Submodel of the fixed fund

The submodel of the fixed fund of the enterprise consists of one state variable and two decision-making variables as illustrated in figure 6.